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SPECIFICATION FOR CANNED *RASOGOLLA*

Third Reprint SEPTEMBER 1999
(Incorporating Amendment No. 1)

UDC 637.146 (Rasogolla)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 8 *July* 1967

Indian Standard

SPECIFICATION FOR CANNED *RASOGOLLA*

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*The draft standard for canned *RASOGOLLA* was prepared by the Dairy Products Subcommittee, AFDC 12 : 2 and was approved for issuing in wide circulation by the Dairy Industry Sectional Committee, AFDC 12 on the recommendations of AFDC 12 : 2. At this stage, AFDC 12 was bifurcated into Dairy Products and Laboratory Apparatus Sectional Committee, AFDC 34 and the Dairy Equipment Sectional Committee, AFDC 35. The subject of canned *RASOGOLLA* fell under the purview of AFDC 34 after splitting of AFDC 12 and hence it has been finalized by AFDC 34.

Indian Standard
SPECIFICATION FOR CANNED *RASOGOLLA*

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 27 April 1967, after the draft finalized by the Dairy Products and Laboratory Apparatus Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 *RASOGOLLA* is a popular sweet prepared generally from cow milk and is a good source of milk proteins. Milk is first boiled and curdled, usually by adding an adequate quantity of whey. It is then filtered by pouring into a mull bag and the curd collected and cooled by immersing the mull bag in cold water. When sufficiently cooled, the bag is taken out and the excess fluid gently squeezed. The sweet curd called '*CHANNA*' is then kneaded to a creamy consistency and made into small balls which are immediately boiled in previously clarified sugar syrup for about 10 minutes. *RASOGOLLAS*, along with hot syrup, are filled in sterilized cans. The filled cans are immediately sealed and cooled.

0.3 Keeping in view the considerable amount of interstate trade and export market of *RASOGOLLAS* quality control is very essential.

0.4 Preparation of this standard had been taken up on a request from Development Council for Food Processing Industries.

0.5 While formulating this standard, necessary consideration has been given to the relevant rules prescribed by the Government of India under the Prevention of Food Adulteration Act, 1954. This standard is subject to restrictions imposed under that Act and the rules framed thereunder, wherever applicable.

0.6 In the preparation of this standard, assistance has been derived from the following:

Food Science. 7, 8; 1958, August; 217-223

0.6.1 Assistance has also been derived from the analytical data supplied by the following organizations:

Central Food Laboratory, Calcutta
National Dairy Research Institute, Karnal

National Dairy Research Institute, Southern Regional Station,
Bangalore

National Dairy Research Institute, Western Regional Station,
Bombay

0.6.2 Co-operation received from various manufacturers of *RASOGOLLA* in the country in the supply of samples for analytical work is appreciated.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and methods of test for canned *RASOGOLLA* prepared from milk.

2. REQUIREMENTS

2.1 Canned *RASOGOLLA* shall be prepared from *CHANNA* obtained from clean, fresh and sweet milk. It shall be white or light creamy in colour. It shall be free from dirt and other foreign matter as well as insect and mould growth. It shall be manufactured and packed under hygienic conditions as prescribed in IS : 2491-1963†.

2.2 *RASOGOLLA* to syrup ratio in the container shall be about **2 : 3** when determined by the method given in **J-3.3**.

2.3 The product shall also comply with the requirements given in Tables 1 and 2.

3. PACKING, MARKING AND STORAGE

3.1 Packing — The material shall be filled in sterilized sanitary cans or any other suitable containers with as little air as possible. The container should preclude contamination with metals or other impurities.

3.2 Marking — Each container shall be marked legibly with the following information:

a) Name of the product,

b) Name and address of the manufacturer,

---

*Rules for rounding off numerical values (*revised*).

†Code for sanitary conditions for food processing units.

c) Net weight of the contents in the container in grams,

d) Batch or code number, and

e) A statement to the effect that the material should be kept in a cool place.

3.2.1 The product may also be marked with Standard mark.

3.2.2 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

TABLE 1 REQUIREMENTS FOR *RASOGOLLA*

(*Clause* 2.3)

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST (REF TO APPENDIX)
(1)	(2)	(3)	(4)
i)	Moisture, percent by weight, *Max*	55·0	A
ii)	Fat, percent by weight, *Min*	5·0	B
iii)	Sucrose, percent by weight, *Max*	45·0	C
iv)	Proteins, percent by weight, *Min*	5·0	D

NOTE — All the requirements are on 'as is' basis.

TABLE 2 REQUIREMENTS FOR SYRUP

(*Clause* 2.3)

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST (REF TO APPENDIX)
(1)	(2)	(3)	(4)
i)	Acidity of syrup, ml of N/10 NaOH required to neutralize 100 ml of the syrup, *Max*	6·0	E
ii)	Concentration of syrup, *Max*	55° Brix	F
iii)	Bacterial count, per gram, *Max*	500	G
iv)	Coliform count, per gram	Nil	H

3.3 Storage — The containers shall be stored in a cool place.

4. TESTS

4.1 The tests shall be carried out as prescribed in the relevant appendices specified in col 4 of Tables 1 and 2.

4.2 Pure chemicals and distilled water (*see* IS : 1070-1960*) shall be employed in the tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

5. SAMPLING

5.1 Representative samples of the product shall be drawn as prescribed in Appendix J.

APPENDIX A

[*Table* 1, *Item* (i)]

DETERMINATION OF MOISTURE

A-1. APPARATUS

A-1.1 Flat-Bottom Moisture Dish with Cover — of stainless steel, nickel, aluminium or porcelain, having about 8 cm diameter and 2·5 cm depth.

A-1.2 Drying Oven — maintained at 102° ± 1°C.

A-1.3 Desiccator

A-2. PROCEDURE

A-2.1 Weigh accurately about 2 g of the material into a dish previously dried and weighed. Heat the dish containing the material after uncovering in the electric oven maintained at 102° ± 1°C for about two hours. Cool in the desiccator and weigh with the cover on. Repeat the process of drying, cooling and weighing at 30 minutes interval until the difference between the two consecutive weighings is less than one milligram. Record the lowest weight.

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*Specification for water, distilled quality (*revised*)

A-3. CALCULATION

A-3.1 Moisture, percent by weight $= \frac{100 (W_1 - W_2)}{W_1 - W}$

where

W_1 = weight in g of the dish with the material before drying,
W_2 = weight in g of the dish with the material after drying, and
W = weight in g of the empty dish.

APPENDIX B

[*Table* 1, *Item* (ii)]

DETERMINATION OF FAT BY ROSE-GOTTLIEB METHOD

B-1. APPARATUS

B-1.1 Fat Extraction Apparatus — as described in IS : 2311-1963*.

B-1.2 Electric Oven — well ventilated and maintained at 100° ± 1°C.

B-2. REAGENTS

B-2.1 Concentrated Ammonia Solution — approximately 35 percent (*w/w*) (sp gr 0·88).

B-2.2 Ethyl Alcohol — 95 to 96 percent (*v/v*) or denatured spirit.

B-2.3 Diethyl Ether — sp gr 0·720, free from peroxide. It may be maintained free from peroxide by adding wet zinc foil (approximately 80 cm^2 per litre, cut in strips long enough to reach at least half way up the container) that has been completely immersed in dilute acidified copper sulphate solution for one minute and subsequently washed with water.

B-2.4 Light Petroleum — boiling range 40° to 60°C, recently distilled.

B-2.5 Mixed Solvent — prepared by mixing equal volumes of diethyl ether and light petroleum.

B-2.6 Sodium Chloride Solution — 0·5 percent (*w/v*).

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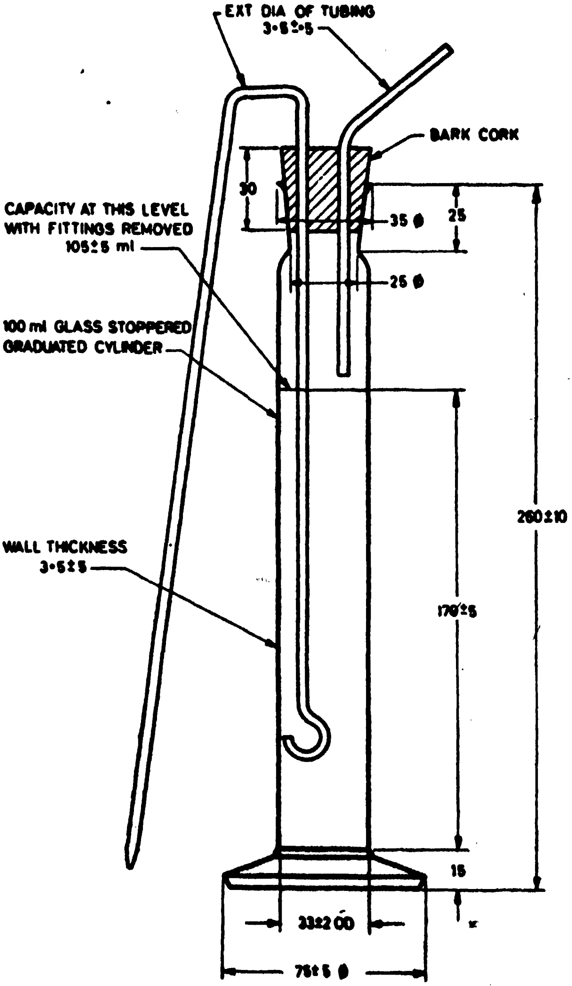
*Specification for fat extraction apparatus for milk and milk products.

B-3. PROCEDURE

B-3.1 Extraction Using Fat Extraction Tube — *see* Fig. 1.


EXT DIA OF TUBING 3·5±·5
BARK CORK
30
CAPACITY AT THIS LEVEL WITH FITTINGS REMOVED 105±5 ml
35 ϕ
25
25 ϕ
100 ml GLASS STOPPERED GRADUATED CYLINDER
260±10
WALL THICKNESS 3·5±5
170±5
15
33±2 OD
75±5 ϕ

All dimensions in millimetres.

Fig. 1 Fat Extraction Tube

B-3.1.1 Weigh accurately about 5 g of well-mixed sample into a small beaker. Add an equal amount of water and rub to a smooth paste. Add 9 ml of water and 1 ml of concentrated ammonia solution and warm in a steam-bath. Add 10 ml of alcohol to the beaker and transfer the contents completely to the fat extraction tube and mix well. Add 25 ml of diethyl ether through the beaker used for weighing the sample. Close the tube with the cork (or stopper), wetted before insertion, and shake vigorously for one minute. The cork (or stopper) shall be wetted with water before each insertion and washed with solvent during each removal. Also, to avoid spurting of the solvent, a slightly reduced pressure should be induced in the tube by cooling before each removal. Rubber stoppers shall not be used. Remove the cork and, with 25 ml of light petroleum, wash the cork and the neck of the tube, so that the washings run into the tube. Replace the cork, again wetted with water, and shake vigorously for 30 seconds. Complete extraction of fat is dependent on satisfactory mixing at each stage.

B-3.1.2 Allow the tube to stand until the ether layer is clear and completely separated from the aqueous layer; this does not take less than 30 minutes. Remove the cork and insert the siphon (or wash-bottle), always keeping the inlet 2 to 3 mm above the interface between the ether and aqueous layers, and transfer the ether layer to a suitable flask containing two small glass beads. Add 5 ml of mixed solvent to the extraction tube, using it to wash the siphon (or wash-bottle) fitting, which is not removed but only raised sufficiently for washings. Lower the fittings and transfer the solvent without shaking the flask. Repeat this operation with a further 5 ml of mixed solvent. Wash the tip of the siphon fitting into the flask and the neck of the flask with the mixed solvent. Remove the siphon fitting and repeat the extraction of the milk residue, using 15 ml of diethyl ether and 15 ml of light petroleum, and repeat the subsequent operations as before. Use diethyl ether to wash the inner limb of the siphon (or wash-bottle) fitting during its removal from the tube. Finally, repeat the extraction once more with 15 ml each of diethyl ether and petroleum.

B-3.2 Extraction Using Mojonnier Fat Extraction Apparatus — *see* Fig. 2.

B-3.2.1 Weigh accurately about 5 g of well-mixed sample into a small beaker. Add an equal amount of water and rub to a smooth paste. Add 9 ml of water and 9 ml of sodium chloride solution. Swirl gently to disperse. With 10 ml of ethyl alcohol, transfer the contents to the Mojonnier fat extraction apparatus. Mix well. Complete extraction of the fat is dependent on satisfactory mixing at each stage.

B-3.2.2 Add 25 ml of diethyl ether through the beaker used for weighing the sample. Close the tube with the cork (or stopper) which is wetted with water before insertion and shake vigorously for one minute. It is essential that the cork (or stopper) be wetted before each insertion and washed with solvent during each removal. Also, to avoid spurting of the solvent, a slightly reduced pressure should be induced in the tube by cooling before each removal. Rubber stoppers shall not be used.

B-3.2.3 Open the tube and add 25 ml of light petroleum, close the tube and shake vigorously for one minute. Allow the tube to stand on the flat

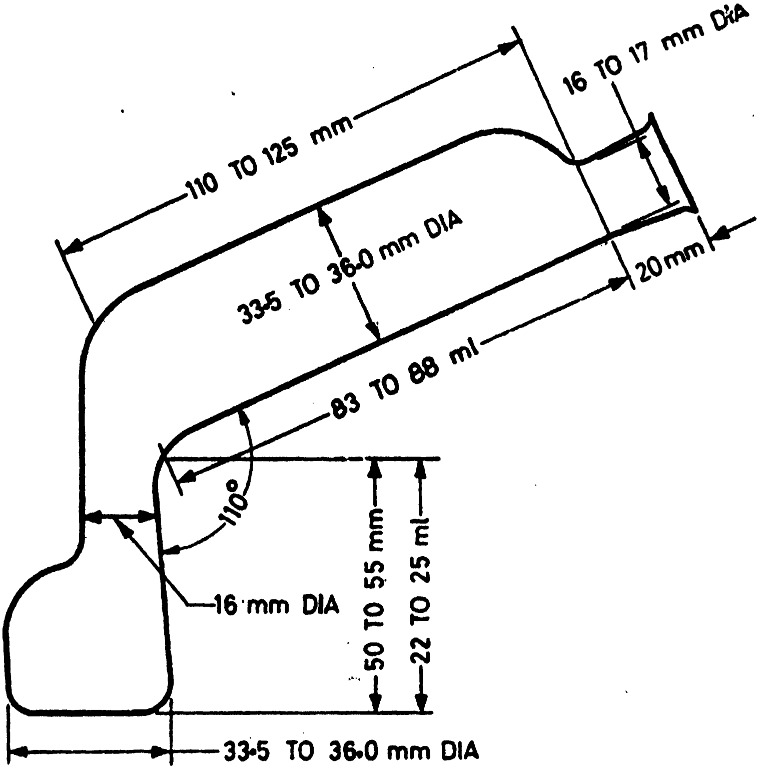


FIG. 2 MOJONNIER FAT EXTRACTION APPARATUS

bottom of the lower bulb until the ethereal layer is clear and completely separated from the aqueous layer, usually for not less than 30 minutes, or centrifuge until clear. Examine the tube to see if the junction of the liquid is at the lower end of the narrow neck of the tube. If it is below this, it should be raised by the addition of a little distilled water run down the side of the tube.

B-3.2.4 Carefully decant, as much as possible, of the supernatant layer into a suitable flask containing two glass beads. Decantation should be done by gradually bringing the cylindrical bulk of the tube into a horizontal position. When the maximum possible supernatant liquid has been poured off, wash the outside of the neck of the tube and the cork or stopper with mixed solvent, collecting the rinsings in the flask. With the Mojonnier tube in a vertical position, wash the inside of the neck with 4 to 5 ml of mixed solvent and decant. Repeat the extraction of milk residue and subsequent operations, using 15 ml of diethyl ether and 15 ml of petroleum.

Finally, repeat the extraction and subsequent operations once more with 15 ml of diethyl ether and 15 ml of petroleum.

B-3.3 Distil carefully the solvent from the flask collected under **B-3.1.2** or **B-3.2.4** and completely remove the solvent. Wipe the flask and dry the residual fat in the oven at 98° to 100°C for one hour, taking precautions to remove all traces of volatile solvent and cooling the flask to room temperature in a desiccator with an efficient desiccant.

B-3.3.1 Extract the fat from the flask with successive 15 ml of light petroleum. After the first addition, the flask should be warmed and the solvent swirled round the sides until all the fat appears to be in solution. Allow any sediment to settle and carefully decant the solution without disturbing the sediment through lightly packed cotton wool in a small funnel to a weighed flask containing two glass beads. Repeat at least twice. Finally, rinse the neck of the flask with light petroleum and, after allowing the flask to stand, decant. As described above, distil off the solvents, heat the flask in the oven, allow to cool and weigh. Repeat heating in oven, cooling and weighing until successive weighings do not show a loss in weight by more than one milligram.

B-3.3.2 Simultaneously, when the above procedure is carried out, make a blank determination with 5 ml of water in place of the sample. Use a similar extraction apparatus, the same reagents and the same technique throughout. The difference in weight before and after the petroleum extractions, after correcting for the blank, is the weight of the fat contained in the weight of the sample taken.

B-4. CALCULATION

B-4.1 Calculate the percent of fat by weight in the sample.

APPENDIX C

[*Table* 1, *Item* (iii)]

DETERMINATION OF SUCROSE

C-0. GENERAL

C-0.1 Two methods, one polarimetric (*see* **C-1**) and the other volumetric (*see* **C-2**), are described for the determination of sucrose. Polarimetric method shall be used for referee purposes. Volumetric (Lane-Eynon) method may be used for routine analysis where facilities for polarimetric method are not available.

C-1. POLARIMETRIC METHOD

C-1.1 Apparatus

C-1.1.1 *Polarimeter* — of suitable type.

C-1.2 Reagents

C-1.2.1 *Mercuric Nitrate Solution* — To 220 g of yellow oxide of mercury, add 300 to 400 ml of water and sufficient nitric acid (sp gr 1·42) to form clear solution, care being taken to use the least possible excess of acid (approximately 140 ml will be required). Dilute to 800 to 900 ml and add 10 percent (*w/v*) sodium hydroxide slowly with constant shaking until slight permanent precipitate is obtained. Dilute to one litre and filter.

NOTE — As solution tends to become acid with age owing to deposition of mercury salts, add dilute alkali occasionally until slight permanent precipitate forms and refilter.

C-1.2.2 *Standard Sodium Hydroxide Solution* — approximately 0·5 N.

C-1.2.3 *Hydrochloric Acid* — sp gr 1·102 9 at 20°/4°C.

C-1.3 Procedure

C-1.3.1 Weigh 20 g of the material into a 100-ml volumetric flask, dilute to mark with water, mix thoroughly and filter through a dry filter paper, discarding the first 5 ml of the filtrate. Pipette 50 ml of the solution into a 100-ml flask, add 25 ml of water and mix. Add 5 ml of the mercuric nitrate solution and shake thoroughly without delay. Neutralize to litmus paper while shaking constantly with the standard sodium hydroxide solution, but take care to avoid alkaline reaction. (About 12-13 ml will be required.) Dilute to 100-ml mark with water, mix thoroughly and filter through a dry filter paper.

C-1.3.1.1 Pipette out 25 ml of the filtrate into a 50-ml volumetric flask, dilute to mark with water and polarize into 200 mm tube.

C-1.3.1.2 Pipette 50 ml of the filtrate into a 100-ml volumetric flask, add 10 ml of hydrochloric acid and set aside for 24 hours at a temperature not below 20°C. Make up to 100 ml at 20°C and polarize.

C-1.3.2 Correct both the readings taken before and after inversion for the volume occupied by protein and fat, assuming that one gram of protein occupies 0·8 ml and one gram of fat occupies 1·075 ml of space. The method given in Appendix D shall be followed for the determination of protein in the sample.

C-1.4 Calculation

C-1.4.1 Sucrose, percent by weight $= \dfrac{2\,600\,(a-b)}{W\left(142{\cdot}35-\dfrac{t}{2}\right)}$

where

a = corrected direct polarization,
b = corrected invert polarization,
W = weight of the material taken for the test, and
t = temperature in degree Celsius of the solution polarized.

C-2. VOLUMETRIC (LANE-EYNON) METHOD

C-2.1 Reagents

C-2.1.1 *Sodium Hydroxide Solution* — approximately 0·1 N, using sodium hydroxide, analytical reagent grade.

C-2.1.2 *Stock Solution of Invert Sugar* — Weigh accurately 9·5 g of pure sucrose on a watch glass and transfer it to one-litre volumetric flask with 100 ml of water. Add 5 ml of concentrated hydrochloric acid. Allow this to stand for 3 days at 20° to 25°C and then make up to volume with water. (This is stable for several months.)

C-2.1.3 *Standard Solution of Invert Sugar* — Neutralize a known aliquot of the stock solution of invert sugar (*see* **C-2.1.2**) with dilute sodium hydroxide using litmus paper and dilute with water to a known volume so that more than 15 ml but less than 50 ml of it shall be required to reduce all the copper in Fehling's solution taken for titration. Note the concentration of invert sugar in this solution as mg per 100 ml (*see also* Note 1). Prepare this solution fresh every day.

Note 1 — When 10 ml of Fehling's solution is taken for titration, a standard invert sugar solution containing 0·12 to 0·30 percent (*w/v*) of invert sugar is used.

C-2.1.4 *Methylene Blue Indicator Solution* — Dissolve 0·2 g of methylene blue in water and dilute to 100 ml.

C-2.1.5 *Fehling's Solution* (*Soxhlet Modification*) — prepared by mixing, immediately before use, equal volumes of Solution A and Solution B prepared as given below.

C-2.1.5.1 *Solution A* — Dissolve 34·639 g of copper sulphate ($CuSO_4$, $5H_2O$) in water, add 0·5 ml of concentrated sulphuric acid of sp gr 1·84 and dilute to 500 ml in a volumetric flask. Filter the solution through prepared asbestos.

C-2.1.5.2 *Solution B* — Dissolve 173 g of Rochelle salt (potassium sodium tartarate-$KNaC_4H_4O_6$, $4H_2O$) and 50 g of sodium hydroxide, analytical reagent grade, in water, dilute to 500 ml in a volumetric flask and allow the solution to stand for two days. Filter this solution through prepared asbestos.

C-2.1.5.3 *Standardization of Fehling's solution* — Pour standard invert sugar solution (*see* C-2.1.3) into a 50-ml burette (*see* Note 6). Pipette 10 ml (*see* Note 1) of Fehling's solution into a 300-ml flask and run in from the burette almost the whole of the standard invert sugar solution required to effect reduction of all the copper, so that not more than one millilitre will be required later to complete the titration. Heat the flask containing the mixture over a wire gauze. Gently boil the contents of the flask for 2 minutes. At the end of this period, add, without interrupting the boiling, one millilitre of methylene blue indicator solution. While the contents of the flask continue to boil, begin to add standard invert sugar solutions (one or two drops at a time) from the burette till blue colour of the indicator just disappears. Titration should be completed within one minute so that contents of the flask boil altogether for 3 minutes without interruption (*see* Note 5). Note the titre (that is, the total volume in millilitres of standard invert sugar solution used for the reduction of all the copper in 10 ml of Fehling's solution).

C-2.1.6 *Zinc Acetate Solution* — Dissolve 21·9 g of crystallized zinc acetate [$Zn(C_2H_3O_2)_2\ 2H_2O$] in water and add 3 ml of glacial acetate acid. Make up to 100 ml.

C-2.1.7 *Potassium Ferrocyanide Solution* — Dissolve 10·6 g of crystalline potassium ferrocyanide in water and make up to 100 ml.

C-2.1.8 *Concentrated Hydrochloric Acid Solution* — sp gr 1·16.

C-2.1.9 *Concentrated Ammonia Solution* — sp gr 0·88.

C-2.1.10 *Dilute Ammonia Solution* — 10 ml concentrated ammonia solution diluted to 100 ml with water.

C-2.1.11 *Dilute Acetic Acid Solution* — approximately equivalent to the dilute ammonia solution in strength.

C-2.2 Procedure

C-2.2.1 *Preparation of the Solution* — Weigh accurately about 40 g of the well-mixed sample and transfer to a 100-ml beaker. Add 50 ml of hot water at 80° to 90°C. Mix and transfer to a 250-ml measuring flask, washing it with successive quantities of distilled water at 60°C until the volume is 120 to 150 ml. Mix, cool to room temperature and add 5 ml of dilute ammonia solution. Mix and allow to stand for 15 minutes. Add the exact equivalent of dilute acetic acid to neutralize the ammonia added. Mix and add 12·5 ml of zinc acetate solution followed by 12·5 ml of potassium ferrocyanide solution. Mix again. Make up to 250-ml mark. Allow to settle and filter. Mark this solution as B_1.

C-2.2.1.1 Pipette 50 ml of solution B_1 (*see* C-2.2.1) into a 100-ml volumetric flask, add 5 ml of concentrated hydrochloric acid and heat at 68°C for 5 minutes. Cool the solution and neutralize with sodium hydroxide solution. Mark this solution as A_1. Make up to 100 ml.

Dilute the solutions B_1 and A_1 so that the volume of solution required for 10 ml Fehling's solution (*see* **C-2.2.2**) is between 15 and 50 ml. Mark them B_2 and A_2, respectively.

C-2.2.2 *Incremental Method of Titration* — Pour the prepared solution (*see* **C-2.2.1.1**) into a 50-ml burette (*see* Note 6). Pipette 10 ml of Fehling's solution into a 300-ml conical flask and run in from the burette 15 ml of the solution. Without further dilution, heat the contents of the flask over a wire gauze and boil. (After the liquid has been boiling for about 15 seconds, it will be possible to judge if the copper is almost all reduced by the bright red colour imparted to the boiling liquid by the suspended cuprous oxide). When it is judged that nearly all the copper is reduced, add one millilitre of methylene blue indicator solution (*see* Note 2). Continue boiling the contents of the flask for one to two minutes from the commencement of ebullition and then add the prepared solution in small quantities (one millilitre or less at a time), allowing the liquid to boil for about 10 seconds between successive additions, till blue colour of the indicator just disappears (*see* Note 5). In case there appears to be still much unreduced copper, after the mixture of Fehling's solution with 15 ml of the prepared solution has been boiling for a quarter of a minute, add the prepared solution from the burette in larger increments (more than one millilitre at a time, according to judgement) and allow the mixture to boil for a quarter of minute after each addition. Repeat the addition of the prepared solution at intervals of 15 seconds until it is considered unsafe to add a large increment of the prepared solution. At this stage, continue boiling for an additional one to two minutes, add one millilitre of methylene blue indicator solution and complete the titration by adding the prepared solution in small quantities (less than one millilitre at a time) (*see also* Note 3).

NOTE 2 — It is advisable not to add the indicator until the neighbourhood of the end point has been reached because the indicator retains its full colour until the end point is almost reached and thus gives warning to the operator to go slowly.

NOTE 3 — When the operator has had a fair amount of experience with the method, a sufficiently accurate result may often be obtained by a single estimation by the incremental method of titration, but for the utmost degree of accuracy of which the method is capable a second titration should be carried out by the standard method of titration (*see* **C-2.2.3**).

C-2.2.3 *Standard Method of Titration* — Pipette 10 ml of Fehling's solution into a 300-ml conical flask and run in from the burette almost the whole of the prepared solution B_2 required to effect reduction of all the copper (determined under **C-2.2.2**), so that, if possible, not more than one millilitre shall be required later to complete the titration. Gently boil the contents of the flask for 2 minutes. At the end of this period, add, without interrupting boling, one millilitre of methylene blue indicator solution. While the contents of the flask continue to boil, begin to add the prepared solution (one or two drops at a time) from the burette till blue colour of the indicator just disappears (*see* Note 4). Titration should be completed within one minute, so that the contents of the flask boil altogether for 3 minutes without interruption.

NOTE 4 — The indicator is so sensitive that it is possible to determine the end point within one drop of the prepared solution in many cases. Complete decolourization of methylene blue is usually indicated by the whole reaction liquid in which cuprous oxide is continuously churned up becoming bright red or orange in colour. In case of doubt, the flame may be removed from the wire gauze for one or two seconds and the flask held against a sheet of white paper. (A holder of paper, suitably fixed round the neck of the flask, is very convenient for this purpose as it may be left round the neck of the flask without the risk of over-balancing it.) The top edge of the liquid would appear bluish if the indicator is not completely decolourized. It is inadvisable to interrupt the boiling as the indicator undergoes back oxidation rather rapidly when air is allowed free access into the flask, but there is no danger of this as long as a continuous stream of steam is issuing from th mouth of the flask.

NOTE 5 — It should be observed that with both the incremental and the standard methods of titration, the flask containing the reaction mixture is left on the wire gauze over the flame throughout titration.

NOTE 6 — In adding sugar solution to the reaction mixture the burette may be held in hand over the flask. The burette may be fitted with a small outlet tube bent twice at right angles, so that the body of the burette can be kept out of steam while adding sugar solution. Burettes with glass taps are unsuitable for this work as taps become heated by steam and are liable to jam.

C-2.2.4 Repeat the titration as given in **C-2.2.2** and **C-2.2.3** using solution A_2 (*see* **C-2.2.1.1**).

C-2.3 Calculation

C-2.3.1 Sucrose, percent by weight $= \frac{20\,W_1}{W_2}\left[\frac{2f_2}{V_2} - \frac{f_1}{V_1}\right]$

where

W_1 = weight in mg of sucrose corresponding to 10 ml of Fehling's solution (*see* **C-2.1.5.3**),

W_2 = weight in g of the material taken for the determination (*see* **C-2.2.1**),

f_2 = dilution factor for solution A_2 from A_1 (*see* **C-2.2.1.1**),

V_2 = volume in ml of solution A_2 corresponding to 10 ml of Fehling's solution (*see* **C-2.2.4**),

f_1 = dilution factor for solution B_2 from B_1 (*see* **C-2.2.1.1**), and

V_1 = volume in ml of solution B_2 corresponding to 10 ml of Fehling's solution (*see* **C-2.2.3**),

APPENDIX D

[*Table* 1, *Item* (iv)]

DETERMINATION OF PROTEINS

D-0. Kjeldahl method and micro-Kjeldahl or boric acid method are prescribed for the determination of protein. Either of the two methods shall be used depending upon the facilities available.

D-1. KJELDAHL METHOD

D-1.1 Apparatus

D-1.1.1 A recommended apparatus, as assembled, is shown in Fig. 3.

D-1.1.1.1 *Description* — The apparatus consists of a round-bottomed flask *A* of 1 000 ml capacity fitted with a rubber stopper through which passes one end of the connecting bulb tube *B*. The other end of the bulb tube *B* is connected to the condenser *C* which is attached by means of a rubber tube to a dip tube *D* which dips into the liquid contained in a beaker *E* of 250 ml capacity.

D-1.2 Reagents

D-1.2.1 *Concentrated Sulphuric Acid* — sp gr 1·84.

D-1.2.2 *Copper Sulphate*

D-1.2.3 *Potassium Sulphate or Anhydrous Sodium Sulphate* — nitrogen-free.

D-1.2.4 *Sodium Hydroxide Solution* — Dissolve about 225 g of sodium hydroxide in 500 ml of water.

D-1.2.5 *Standard Sodium Hydroxide* — approximately 0·1 N.

D-1.2.6 *Standard Sulphuric Acid* — approximately 0·1 N.

D-1.2.7 *Methyl Red Indicator* — Dissolve 1 g of methyl red in 200 ml of rectified spirit, 95 percent (*v*/*v*).

D-1.3 Procedure

D-1.3.1 Transfer carefully about 3 g of accurately weighed material to the Kjeldahl flask, taking precaution to see that particles of the sample do not, as far as possible, stick in the neck of the flask. Add 25 ml of concentrated sulphuric acid through the neck of the flask so that it washes the material, if any sticking to the sides of the flask. Add about 0·2 g of copper sulphate into the flask. Place the flask in an inclined position.

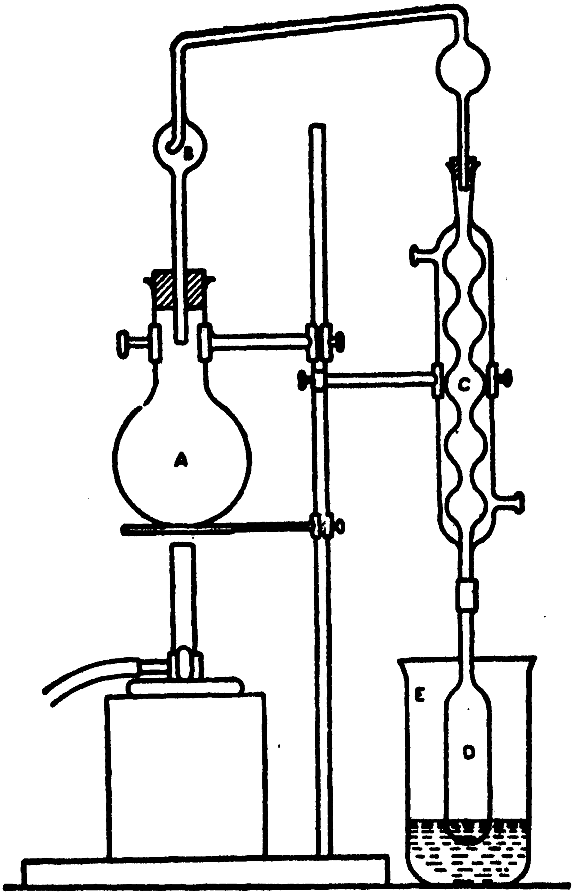


FIG. 3 APPARATUS FOR DETERMINATION OF PROTEIN

Heat below the boiling point of the acid until frothing ceases. Add about 10 g of potassium sulphate. Increase heat until acid boils vigorously and digest for 30 minutes after the mixture becomes clear and pale green or colourless. Wash down with the minimum quantity of concentrated sulphuric acid particles, if any, sticking to the sides and continue digestion for 60 to 90 minutes. Cool the contents of the flask. Transfer quantitatively to a 1 000-ml round-bottomed flask *A* and dilute to 250 ml. Add with shaking a few pieces of pumice stones to prevent bumping. Add about 50 ml of sodium hydroxide solution or more (which is sufficient to make the solution alkaline) carefully through the side of the flask, so that it does not mix at once with the acid solution but forms a layer below it. Assemble the apparatus as shown in Fig. 3, taking care that the tip of the condenser extends below the surface of a known quantity of standard sulphuric acid contained in the beaker *E*. Mix the contents of the flask by shaking and distil until all ammonia has passed over into the standard sulphuric acid. Detach flask *A* from the condenser and shut off the burner. Rinse the condenser thoroughly with water into the beaker *E*. Wash the dip tube *D* carefully so that all traces of condensate are transferred to the beaker. When all the washings have drained into the beaker *E*, add two or three drops of methyl red indicator and titrate with standard sodium hydroxide solution.

Carry out a blank using all reagents in the same quantities and with 0·5 g of sucrose in place of the material.

D-1.4 Calculation

D-1.4.1 Protein is calculated by multiplying nitrogen content by the factor 6·38.

$$\text{Protein, percent by weight} = \frac{8{\cdot}93\,(B - A)\,N}{W}$$

where

B = volume in ml of standard sodium hydroxide solution used to neutralize the acid in blank determination,

A = volume in ml of standard sodium hydroxide solution used to neutralize the excess of acid in the test with the material,

N = normality of standard sodium hydroxide solution, and

W = weight in g of material taken for the test.

D-2. MICRO-KJELDAHL METHOD

D-2.1 Apparatus

D-2.1.1 *Distillation Apparatus* — Micro-Kjeldahl distillation apparatus as shown in Fig. 4.

D-2.1.2 *Digestion Flask* — Kjeldahl flask.

D-2.2 Reagents

D-2.2.1 *Concentrated Sulphuric Acid* — sp gr 1·84, nitrogen-free.

D-2.2.2 *Mercuric Oxide* — nitrogen-free.

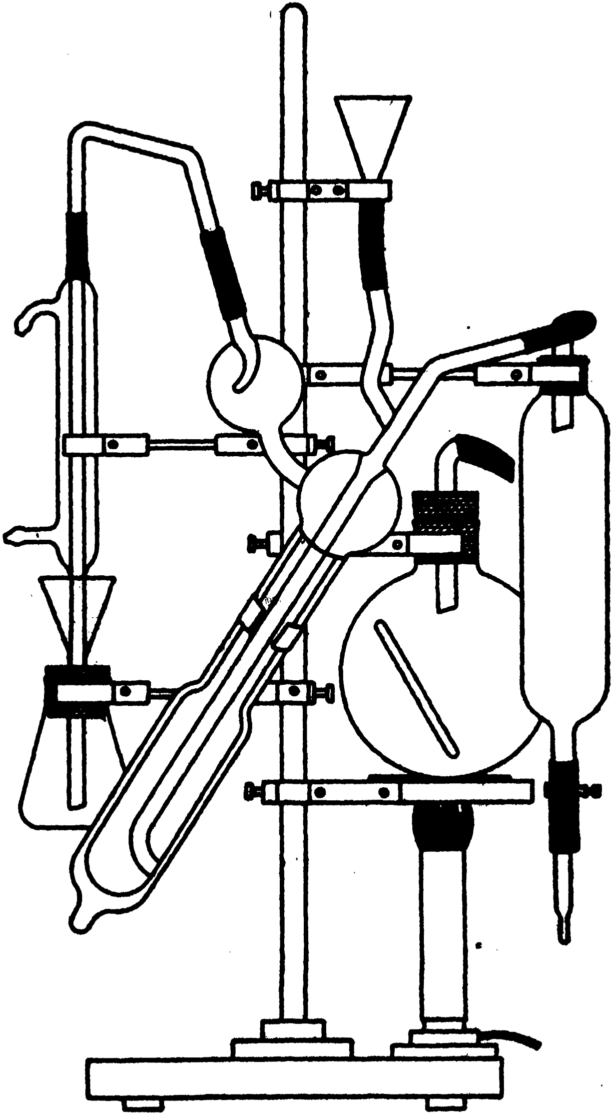


FIG. 4 MICRO-KJELDAHL DISTILLATION APPARATUS

D-2.2.3 *Potassium Sulphate* — nitrogen-free.

D-2.2.4 *Sodium Hydroxide-Sodium Thiosulphate Solution* — Dissolve 60 g of sodium hydroxide and 5 g of sodium thiosulphate in water and dilute to 100 ml.

D-2.2.5 *Boric Acid Solution* — saturated.

D-2.2.6 *Indication Solution* — Prepare by mixing one part of 0·2 percent alcoholic methyl red solution with five parts of 0·2 percent alcoholic bromocresol green solution.

D-2.2.7 *Hydrochloric Acid Solution* — 0·02 N.

D-2.3 Procedure

D-2.3.1 Weigh accurately about 3 g of the sample and transfer carefully to the Kjeldahl flask, taking precaution to see that particles of the sample do not stick in the neck of the flask. Add 10·0 g of potassium sulphate, 0·5 g of mercuric oxide and 20 ml of sulphuric acid to the flask. Mix the contents, add boiling chips and heat the flask carefully on the digestion apparatus until foaming stops and the contents have become liquid. Continue the digestion with more vigorous heating until the contents of the Kjeldahl flask are completely clear and colourless. During the heating, mix the contents from time to time. Boil the liquid vigorously for 1½ hours after it has become clear. Avoid local over-heating. Cool the contents of the flask to room temperature and make up to volume in a 100-ml volumetric flask. Pipette 10 ml of aliquot of the solution to the micro-Kjeldahl distillation apparatus and make the solution alkaline by 8 ml of sodium hydroxide-sodium thiosulphate solution and steam distil. Absorb the ammonia evolved in 5 ml of boric acid solution containing 2 to 3 drops of the indicator. Collect about 25 ml of distillate and titrate against the hydrochloric acid till violet colour appears.

D-2.3.2 Carry out a blank using all reagents except the test material.

D-2.4 Calculation

D-2.4.1 Protein is calculated by multiplying nitrogen content by the factor 6·38.

$$\text{Protein, percent by weight} = \frac{89{\cdot}32\,(V_2 - V_1)\,N}{W}$$

where

V_2 = number of ml of hydrochloric acid used in distillation,
V_1 = number of ml of hydrochloric acid used in the blank test,
N = normality of hydrochloric acid, and
W = weight in g of the sample taken for analysis.

APPENDIX E

[*Table 2, Item* (i)]

DETERMINATION OF ACIDITY OF SYRUP

E-1. REAGENTS

E-1.1 Standard Sodium Hydroxide Solution — 0·1 N.

E-1.2 Phenolphthalein Indicator Solution — Dissolve 0·5 g of phenolphthalein in 100 ml of 50 percent ethyl alcohol (*v/v*).

E-2. PROCEDURE

E-2.1 Measure 100 ml of syrup in a suitable titration flask. Add one millilitre of phenolphthalein indicator solution. Shake well and titrate against standard sodium hydroxide solution. The persistence of slight pinkish tinge for 30 seconds indicates the end point. Report acidity as the number of ml of 0·1 N sodium hydroxide solution used to neutralize 100 ml of syrup.

APPENDIX F

[*Table 2, Item* (ii)]

DETERMINATION OF CONCENTRATION OF SYRUP

F-1. APPARATUS

F-1.1 Specific Gravity Bottle

F-2. PROCEDURE

F-2.1 Clean and thoroughly dry the specific gravity bottle and weigh it. Fill it up to the mark with freshly boiled and cooled water maintained at a temperature of 20° ± 1°C and weigh. Remove the water, dry the bottle again and fill it with the syrup maintained at the same temperature. Weigh the bottle again.

F-3. CALCULATION

F-3.1 Specify the temperature of testing.

F-3.1.1 Calculate as follows:

$$\text{Specific gravity at } 20°/20°\text{C} = \frac{C - A}{B - A}$$

where

C = weight in g of the specific gravity bottle with the material,
A = weight in g of the empty specific gravity bottle, and
B = weight in g of the specific gravity bottle with water.

F-3.1.1.1 Calculate the degrees Brix with the help of the table given in Appendix K.

APPENDIX G

[*Table* 2, *Item* (iii)]

DETERMINATION OF BACTERIAL COUNT

G-1. APPARATUS

G-1.1 Weighing Scoop, Sterile — with counter weight.

G-1.2 Bacteriological Transfer Pipettes, Sterile — accurately graduated, with cotton plug in the upper orifice.

G-1.3 Dilution Bottles, Sterile — made of heat-resistant glass (preferably borosilicate glass) closed with rubber stoppers, preferably screw caps, with new friction-fit liners for making them leak-proof and of the following capacities:

a) 150 ml, with mark at 99 ml level; and
b) 25 ml, with mark at 9 ml level.

G-1.4 Petri Dishes — with outside dish diameter 100 mm, inside dish diameter 91 mm and depth 15 mm. The exterior and interior surfaces of the bottoms should be flat and free from bubbles, scratches or other defects which would interfere with the counting of colonies.

G-1.5 Bacteriological Tubes, Sterile — 25 ml capacity with a mark at 10 ml level, with cotton plugs.

G-2. REAGENTS

G-2.1 Dilution Waters — There shall be two types of dilution waters, namely, Dilution Water 1 for use with Medium 1 (*see* **G-2.2.1**) and Dilution Water 2 for use with Medium 2 (*see* **G-2.2.2**).

G-2.1.1 *Dilution Water* 1 — Dissolve 34 g of potassium dihydrogen phosphate (KH_2PO_4) in 500 ml of water, adjust to *p*H 7·2 with 1 N sodium hydroxide solution and make up to one litre with water. Dilute 1·25 ml of this stock phosphate buffer solution with distilled water to one litre to obtain dilution water.

G-2.1.2 *Dilution Water* 2 — shall be of the following composition:

Sodium chloride	9·0 g
Potassium chloride	0·42 g
Calcium chloride	0·48 g
Sodium bicarbonate	0·20 g
Water	1 000 ml

G-2.2 Media — Either of the two media given in **G-2.2.1** and **G-2.2.2** shall be used, but, in case of dispute, the second medium shall be made use of.

G-2.2.1 *Medium* 1 — shall be of the following composition:

Peptone	5·0 g
Yeast extract	2·5 g
Glucose (dextrose)	1·0 g
Agar, bacteriological grade	20·0 g
Water	1 000 ml

G-2.2.1.1 *Preparation* — Soak the material (*see* **G-2.2.1**) for 3 to 5 minutes in cold water, then bring the mixture into complete solution with the minimum delay by boiling above an asbestos-centred wire gauze over a flame. Stir continuously and efficiently to avoid charring. Adjust the solution to *p*H 7·0 at 50°C with sodium hydroxide solution. Filter through a cotton pad till clear filtrate is obtained. Fill in bacteriological tubes to 10-ml mark. Sterilize in an autoclave at 121°C for 20 minutes.

G-2.2.2 *Medium* 2 — shall be of the following composition:

Yeastrel	3·0 g
Peptone	5·0 g
Agar, bacteriological grade	20·0 g
Fresh whole milk	10 ml
Water	1 000 ml

G-2.2.2.1 *Preparation* — Dissolve yeastrel and peptone in distilled water in a steamer and adjust the reaction at room temperature to *p*H 7·0 to 7·2 using phenol red as indicator. Wrap shreded agar in muslin and wash in running cold water for 15 minutes. Squeeze out the excess cold water and add agar to the broth and boil it so as to dissolve the agar completely.

Filter the medium hot through paper pulp (*see* Note) in a Buchner funnel. (Egg should not be used for clearing.) Test the reaction of the filtrate at 50°C and adjust, if necessary, to *p*H 7·0. Add the freshly shaken whole milk to the filtered medium. Fill this medium into bacteriological tubes to 10-ml mark. Sterilize in an autoclave at 121°C for 20 minutes.

NOTE — Paper pulp is prepared by pulping small pieces of postlip or white heather paper in water by means of a pestle and mortar. A single layer of Chardin filter paper or any other suitable filter paper should be laid on top of the Buchner funnel to prevent the pulp from being sucked through. The pulp should then be packed down evenly on top of it. The filter, when ready for use, should have a total depth of about 1·5 mm.

G-3. PROCEDURE

G-3.1 Dilution — Weigh 11 g of the material from the sample, using a sterile pipette, and suspend in 99 ml of dilution water at 45°C. Agitate to mix the contents properly. Prepare dilutions of this so as to give between 30 and 300 colonies per plate (*see* **G-3.5**). Add one millilitre of suitable dilutions in triplicate to the sterile petri dishes.

G-3.2 Pouring Plates — Melt the agar medium (*see* **G-2.2.1** or **G-2.2.2**) in bacteriological tubes and keep at 48° to 50°C. Introduce the medium aseptically, at 42° to 44°C, into petri dishes and mix by rotating and tilting the dishes without spreading over the edges. Spread the mixture evenly over the bottom of the plate. Allow to solidify.

G-3.3 Incubation — Invert the plates and incubate at 37°C for 48 hours.

G-3.4 Counting — Count the colonies with the aid of a magnifying lens under uniform and properly controlled illumination. Count only those plates which have 30 to 300 colonies, including those of pin point size.

G-3.5 Computation — Compute the bacterial count per gram from the dilutions used (*see* **G-3.1**).

NOTE — All precautions shall be observed to prevent microbiological contamination throughout the test.

APPENDIX H

[*Table* 2, *Item* (iv)]

DETERMINATION OF COLIFORM COUNT

H-1. GENERAL

H-1.1 Coliform Bacteria — Coliform bacteria include all aerobic and facultative anaerobic gram negative non-spore forming bacteria which ferment lactose with the production of acid and gas. A positive presumptive test is indicated by the formation of acid and gas within 48 hours at 35° to 37°C in a fermentation tube containing lactose bile salt broth. Alternatively, the development of dark red colonies at least 0·5 mm in diameter in a solid medium (violet red bile agar) within 20 to 24 hours at 35° to 37°C may be considered as a positive evidence of the presence of coliform bacteria. Violet red bile agar is one of the standard media used for the determination of general types of coliform organisms including those of faecal origin in water, milk and other materials of sanitary importance.

H-2. APPARATUS

H-2.1 Weighing Scoop, Sterile — with counter weight.

H-2.2 Bacteriological Transfer Pipettes, Sterile — Accurately graduated with cotton plug in the upper orifice.

H-2.3 Dilution Bottles, Sterile — made of heat-resistant glass (preferably borosilicate glass) closed with rubber stoppers, preferably screw caps, with new friction-fit liners for making them leak-proof and of the following capacities:

a) 150 ml, with mark at 99 ml level; and
b) 25 ml, with mark at 9 ml level.

H-2.4 Petri Dishes — with outside dish diameter 100 mm, inside dish diameter 91 mm and depth 15 mm. The exterior and interior surfaces of the bottom should be flat and free from bubbles, scratches or other defects which would interfere with the counting of colonies.

H-2.5 Bacteriological Tubes, Sterile — 25 ml capacity with a mark at 10 ml level, with cotton plugs.

H-2.6 Tubes Having Inverted Vials — Durham tubes.

H-3. REAGENTS

H-3.1 Dilution Water — Dissolve 34 g of potassium dihydrogen phosphate (KH_2PO_4) in 500 ml of distilled water, adjust to *p*H 7·4 with 1 N sodium hydroxide solution and make up to one litre with distilled water. Dilute 1·25 ml of this stock phosphate buffer solution with distilled water to one litre to obtain dilution water.

H-3.2 Medium — Violet red bile agar shall be the medium, the composition of which shall be as follows:

Yeast extract	3·0 g
Peptone	7·0 g

Sodium taurocholate	1·5 g
Lactose	10·0 g
Sodium chloride	5·0 g
Agar-agar	20·0 g
Indicator:	
Neutral red	0·03 g
Crystal violet	0·002 g
Water	1 000 ml
Final *p*H	7·4 ± 0·1

H-3.2.1 *Preparation and Sterilization of Medium* — Soak the material (*see* **H-3.2**) for 3 to 5 minutes in cold water, then bring the mixture into complete solution with the minimum delay by boiling above an asbestos-centred wire gauze over a flame. Stir continuously and efficiently to avoid charring. Adjust the solution to *p*H 7·4 ± 0·1 at 50°C with sodium hydroxide solution. Filter through a cotton pad till clear filtrate is obtained. Fill in bacteriological tubes to 10-ml mark. Sterilize in an autoclave at 121°C for 15 minutes.

H-4. PROCEDURE

H-4.1 Dilution — Weigh 11 g of the material from the samples, using a sterile pipette, and suspend in 99 ml of dilution water at 45°C. Agitate mildly to mix the contents properly. Prepare dilutions of this and add one millilitre of suitable dilutions in triplicate to the sterile petri dishes.

H-4.2 Pouring Plates — Melt the medium (*see* **H-3.2.1**) in bacteriological tubes and keep at 48° to 50°C. Introduce this medium aseptically at 42° to 44°C into petri dishes and mix by rotating and tilting the dishes without spreading over the edges. Spread the mixture evenly over the bottom of the plate. Allow to solidify. After solidification of the medium in the plate, add cover layer of medium.

H-4.3 Incubation — Invert the plates and incubate at 35° to 37°C for 24 hours.

H-4.4 Counting — Count the dark red colonies with a diameter of 0·5 mm or over.

H-4.5 Computation — Compute the coliform count per gram from the dilutions used (*see* **H-4.1**).

NOTE 1 — In case of doubt regarding the colonies developed on violet red bile agar, representative colonies are picked and transferred to lactose bile salt broth in tubes having inverted vials. Production of acid and gas is confirmatory for coliform organisms.

NOTE 2 — All precautions shall be observed to prevent microbiological contamination throughout the test.

APPENDIX J

(*Clause* 5.1)

SAMPLING OF *RASOGOLLA*

J-1. GENERAL REQUIREMENTS

J-1.0 In drawing, preparing, storing and handling the samples, the following precautions and directions shall be observed.

J-1.1 The sampling instrument shall be clean and dry when used.

J-1.2 Precautions shall be taken to protect the samples, the materials being sampled, the sampling instrument and the containers from adventitious contamination.

J-1.3 Sampling shall be done by a person agreed to between the purchaser and the vendor and, if desired by either of them, in the presence of the purchaser (or his representative) and the vendor (or his representative).

J-2. SCALE OF SAMPLING

J-2.1 Lot — All the containers in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture, the containers belonging to the same batch shall be grouped together and each group shall constitute a separate lot.

J-2.1.1 Samples shall be tested for each lot ascertaining the conformity of the material to the requirements of this standard.

J-2.2 The number *n* of containers to be selected from the lot shall depend on the size *N* of the lot and shall be as given in Table 3.

TABLE 3 NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING

LOT SIZE *N* (1)	NO. OF CONTAINERS TO BE SELECTED *n* (2)
101 to 300	9
301 „ 500	12
501 „ 1 000	15
1 001 „ 3 000	21
3 001 and above	27

NOTE — Up to 100 the sample size may be as agreed to between the purchaser and the vendor.

J-2.3 These containers shall be selected at random from the lot and, to ensure the randomness of selection, a random number table as agreed to between the purchaser and the vendor shall be used. In case such a table is not available, the following procedure shall be adopted.

J-2.3.1 Starting from any container, count them as 1, 2, 3, ..., etc up to *r* in a systematic manner. Every *r*th container thus counted shall be withdrawn from the lot to give a sample for test where $r = N/n$, N being the size of the lot and n the number of containers to be selected (*see* Table 3). In case *r* comes to be a fractional number, its value shall be taken as equal to the integral part of it.

J-3. TEST SAMPLES AND REFEREE SAMPLE

J-3.1 The containers selected as in **J-2.2** shall be divided at random into three equal sets and labelled with all the particulars of sampling. One of these sets of sample containers shall be for the purchaser, another for the vendor and the third for the referee.

J-3.2 Referee Sample — The referee sample shall consist of a set of sample containers and shall bear the seals of the purchaser and the vendor (or their representatives) and shall be kept at a place agreed to between the two.

J-3.3 Preparation of Sample for Analysis — Keep the containers in the sample at 40°C for 20 minutes. Empty the containers individually on a sieve of about one square centimetre mesh and of such size that all the *RASOGOLLAS* are in one layer. Allow the syrup to drain for 10 minutes in a tared container. The weight of the *RASOGOLLA* and the syrup are recorded to determine the ratio of *RASOGOLLA* to syrup separately for each container in the sample (*see* **2.2**).

J-3.3.1 Cut the *RASOGOLLA* into small pieces and mix thoroughly in a suitable mixer separately for each container. Thus there will be as many mixed samples as the number of containers in the sample. Each of the mixed samples shall be tested separately for requirements given in Table 1.

J-3.3.2 The syrup collected from individual containers shall be mixed to form a composite sample. This composite sample shall be tested for requirements given in Table 2.

J-4. CRITERION FOR CONFORMITY

J-4.1 The lot shall be declared as conforming to this specification if the requirements specified in **J-4.1.1** to **J-4.1.3** are satisfied.

J-4.1.1 On each of the selected containers, *RASOGOLLA* to syrup ratio shall be about 1 : 3 (*see* **2.2**).

J-4.1.2 The test results on the composite sample prepared in accordance with **J-3.3.2** shall satisfy the requirements for the characteristics as given in Table 2.

J-4.1.3 The test results for moisture, fat, sucrose and proteins on *RASOGOLLA* shall be recorded as shown in Table 4. The mean and range for the test results of the containers shall be calculated as follows:

$$\text{Mean } (\bar{X}) = \frac{\text{Sum of test results}}{\text{Number of test results}}$$

$$\text{Range } (R) = \text{The difference between the maximum and the minimum values of test results.}$$

The mean and range shall be recorded as shown in col 4 and 5 of Table 4 respectively. The corrected mean as given in col 6 of Table 4 shall be calculated. If the corrected mean satisfies the condition given in col 7 of Table 4 the lot shall be considered as satisfying the requirement of the characteristic.

TABLE 4 CRITERIA FOR CONFORMITY

SL No.	CHARACTERISTIC	TEST RESULTS	MEAN	RANGE	CORRECTED MEAN	CRITERIA FOR CONFORMITY
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Moisture	1, 2 ...... n	$\bar{X}_1$	R_1	$\bar{X}_1 + 0{\cdot}6\,R_1$	Corrected Mean $\leqslant$ 50·0
ii)	Fat	1, 2 ...... n	$\bar{X}_2$	R_2	$\bar{X}_2 - 0{\cdot}6\,R_2$	Corrected Mean $\geqslant$ 7·0
iii)	Sucrose	1, 2 ...... n	$\bar{X}_3$	R_3	$\bar{X}_3 + 0{\cdot}6\,R_3$	Corrected Mean $\leqslant$ 45·0
iv)	Protein	1, 2 ...... n	$\bar{X}_4$	R_4	$\bar{X}_4 - 0{\cdot}6\,R_4$	Corrected Mean $\geqslant$ 5·0

APPENDIX K

(*Clause* F-3.1.1.1)

DEGREES BRIX, SPECIFIC GRAVITY AND DEGREES BAUME OF SUGAR SOLUTIONS

DEGREE BRIX OR PERCENT BY WEIGHT OF SUCROSE	SPECIFIC GRAVITY AT 20°/20°C	SPECIFIC GRAVITY AT 20°/4°C	DEGREE BAUME (MODULUS 145)
30·0	1·128 98	1·126 984	16·57
30·2	1·129 93	1·127 939	16·67
30·4	1·130 89	1·128 896	16·78
30·6	1·131 85	1·129 853	16·89
30·8	1·132 81	1·130 812	17·00
31·0	1·133 78	1·131 773	17·11
31·2	1·134 74	1·132 735	17·22
31·4	1·135 70	1·133 698	17·33
31·6	1·136 67	1·134 663	17·43
31·8	1·137 64	1·135 628	17·54
32·0	1·138 61	1·136 596	17·65
32·2	1·139 58	1·137 565	17·76
32·4	1·140 55	1·138 534	17·87
32·6	1·141 52	1·139 506	17·98
32·8	1·142 50	1·140 479	18·08
33·0	1·143 47	1·141 453	18·19
33·2	1·144 45	1·142 429	18·30
33·4	1·145 43	1·143 405	18·41
33·6	1·146 41	1·144 384	18·52
33·8	1·147 39	1·145 363	18·63
34·0	1·148 37	1·146 345	18·73
34·2	1·149 36	1·147 328	18·84
34·4	1·150 34	1·148 313	18·95
34·6	1·151 33	1·149 298	19·06
34·8	1·152 32	1·150 286	19·17
35·0	1·153 31	1·151 275	19·28
35·2	1·154 30	1·152 265	19·38
35·4	1·155 30	1·153 256	19·49
35·6	1·156 29	1·154 249	19·60
35·8	1·157 29	1·155 242	19·71

Degree Brix or Percent by Weight of Sucrose	Specific Gravity at 20°/20°C	Specific Gravity at 20°/4°C	Degree Baume (Modulus 145)
36·0	1·158 28	1·156 238	19·81
36·2	1·159 28	1·157 235	19·92
36·4	1·160 28	1·158 233	20·03
36·6	1·161 28	1·159 233	20·14
36·8	1·162 28	1·160 233	20·25
37·0	1·163 29	1·161 236	20·35
37·2	1·164 30	1·162 240	20·46
37·4	1·165 30	1·163 245	20·57
37·6	1·166 31	1·164 252	20·68
37·8	1·167 32	1·165 259	20·78
38·0	1·168 33	1·166 269	20·89
38·2	1·169 34	1·167 281	21·00
38·4	1·170 36	1·168 293	21·11
38·6	1·171 38	1·169 307	21·21
38·8	1·172 39	1·170 322	21·32
39·0	1·173 41	1·171 340	21·43
39·2	1·174 43	1·172 359	21·54
39·4	1·175 45	1·173 379	21·64
39·6	1·176 48	1·174 400	21·75
39·8	1·177 50	1·175 423	21·86
40·0	1·178 53	1·176 447	21·97
40·2	1·179 56	1·177 473	22·07
40·4	1·180 58	1·178 501	22·18
40·6	1·181 62	1·179 527	22·29
40·8	1·182 65	1·180 560	22·39
41·0	1·183 68	1·181 592	22·50
41·2	1·184 72	1·182 625	22·61
41·4	1·185 75	1·183 660	22·72
41·6	1·186 79	1·184 696	22·82
41·8	1·187 83	1·185 734	22·93
42·0	1·188 87	1·186 773	23·04
42·2	1·189 92	1·187 814	23·14
42·4	1·190 96	1·188 856	23·25
42·6	1·192 01	1·189 901	23·36
42·8	1·193 05	1·190 946	23·46

DEGREE BRIX OR PERCENT BY WEIGHT OF SUCROSE	SPECIFIC GRAVITY AT 20°/20°C	SPECIFIC GRAVITY AT 20°/4°C	DEGREE BAUME (MODULUS 145)
43·0	1·194 10	1·191 993	23·57
43·2	1·195 15	1·193 041	23·68
43·4	1·196 20	1·194 090	23·78
43·6	1·197 26	1·195 141	23·89
43·8	1·198 31	1·196 193	24·00
44·0	1·199 36	1·197 247	24·10
44·2	1·200 42	1·198 303	24·21
44·4	1·201 48	1·199 360	24·32
44·6	1·202 54	1·200 420	24·42
44·8	1·203 60	1·201 480	24·53
45·0	1·204 67	1·202 540	24·63
45·2	1·205 73	1·203 603	24·74
45·4	1·206 80	1·204 668	24·85
45·6	1·207 87	1·205 733	24·95
45·8	1·208 94	1·206 801	25·06
46·0	1·210 01	1·207 870	25·17
46·2	1·211 08	1·208 940	25·27
46·4	1·212 15	1·210 013	25·38
46·6	1·213 23	1·211 086	25·48
46·8	1·214 31	1·212 162	25·59
47·0	1·215 38	1·213 238	25·70
47·2	1·216 46	1·214 317	25·80
47·4	1·217 55	1·215 395	25·91
47·6	1·218 63	1·216 476	26·01
47·8	1·219 71	1·217 559	26·12
48·0	1·220 80	1·218 643	26·23
48·2	1·221 89	1·219 729	26·33
48·4	1·222 98	1·220 815	26·44
48·6	1·224 06	1·221 904	26·54
48·8	1·225 16	1·222 995	26·65
49·0	1·226 25	1·224 086	26·75
49·2	1·227 35	1·225 180	26·86
49·4	1·228 44	1·226 274	26·96
49·6	1·229 54	1·227 371	27·07
49·8	1·230 64	1·228 469	27·18

DEGREE BRIX OR PERCENT BY WEIGHT OF SUCROSE	SPECIFIC GRAVITY AT 20°/20°C	SPECIFIC GRAVITY AT 20°/4°C	DEGREE BAUME (MODULUS 145)
50·0	1·231 74	1·229 567	27·28
50·2	1·232 84	1·230 668	27·39
50·4	1·233 95	1·231 770	27·49
50·6	1·235 06	1·232 874	27·60
50·8	1·236 16	1·233 979	27·70
51·0	1·237 27	1·235 085	27·81
51·2	1·238 38	1·236 194	27·91
51·4	1·239 49	1·237 303	28·02
51·6	1·240 60	1·238 414	28·12
51·8	1·241 72	1·239 527	28·23
52·0	1·242 84	1·240 641	28·33
52·2	1·243 95	1·241 757	28·44
52·4	1·245 07	1·242 873	28·54
52·6	1·246 19	1·243 992	28·65
52·8	1·247 31	1·245 113	28·75
53·0	1·248 44	1·246 234	28·86
53·2	1·249 56	1·247 358	28·96
53·4	1·250 69	1·248 482	29·06
53·6	1·251 82	1·249 609	29·17
53·8	1·252 95	1·250 737	29·27
54·0	1·254 08	1·251 866	29·38
54·2	1·255 21	1·252 997	29·48
54·4	1·256 35	1·254 129	29·59
54·6	1·257 48	1·255 264	29·69
54·8	1·258 62	1·256 400	29·80
55·0	1·259 76	1·257 535	29·90
55·2	1·260 90	1·258 674	30·00
55·4	1·262 04	1·259 815	30·11
55·6	1·263 19	1·260 955	30·21
55·8	1·264 33	1·262 099	30·32
56·0	1·265 48	1·263 243	30·42
56·2	1·266 63	1·264 390	30·52
56·4	1·267 78	1·265 537	30·63
56·6	1·268 93	1·266 686	30·73
56·8	1·270 08	1·267 837	30·83

Degree Brix or Percent by Weight of Sucrose	Specific Gravity at 20°/20°C	Specific Gravity at 20°/4°C	Degree Baume (Modulus 145)
57·0	1·271 23	1·268 989	30·94
57·2	1·272 39	1·270 143	31·04
57·4	1·273 55	1·271 299	31·15
57·6	1·274 71	1·272 455	31·25
57·8	1·275 87	1·273 614	31·35
58·0	1·277 03	1·274 774	31·46
58·2	1·278 19	1·275 936	31·56
58·4	1·279 36	1·277 098	31·66
58·6	1·280 52	1·278 262	31·76
58·8	1·281 69	1·279 428	31·87
59·0	1·282 86	1·280 595	31·97
59·2	1·284 04	1·281 764	32·07
59·4	1·285 20	1·282 935	32·18
59·6	1·286 38	1·284 107	32·28
59·8	1·287 55	1·285 281	32·38
60·0	1·288 73	1·286 456	32·49
60·2	1·289 91	1·287 633	32·59
60·4	1·291 09	1·288 811	32·69
60·6	1·292 27	1·289 991	32·79
60·8	1·293 46	1·291 172	32·90
61·0	1·294 64	1·292 354	33·00
61·2	1·295 83	1·293 539	33·10
61·4	1·297 01	1·294 725	33·20
61·6	1·298 20	1·295 911	33·31
61·8	1·299 40	1·297 100	33·41
62·0	1·300 59	1·298 291	33·51
62·2	1·301 78	1·299 483	33·61
62·4	1·302 98	1·300 677	33·72
62·6	1·304 18	1·301 871	33·82
62·8	1·305 37	1·303 068	33·92
63·0	1·306 57	1·304 267	34·02
63·2	1·307 78	1·305 467	34·12
63·4	1·308 98	1·306 669	34·23
63·6	1·310 19	1·307 872	34·33
63·8	1·311 39	1·309 077	34·43

DEGREE BRIX OR PERCENT BY WEIGHT OF SUCROSE	SPECIFIC GRAVITY AT 20°/20°C	SPECIFIC GRAVITY AT 20°/4°C	DEGREE BAUME (MODULUS 145)
64·0	1·312 60	1·310 282	34·53
64·2	1·313 81	1·311 489	34·63
64·4	1·315 02	1·312 699	34·74
64·6	1·316 23	1·313 909	34·84
64·8	1·317 45	1·315 121	34·94
65·0	1·318 66	1·316 334	35·04
65·2	1·319 88	1·317 549	35·14
65·4	1·321 10	1·318 766	35·24
65·6	1·322 32	1·319 983	35·34
65·8	1·323 54	1·321 203	35·45

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